

Claims

We claim:

1. An automated rotary microtome blade changing apparatus, comprising
 - (a) an upper stage adapted to releasably engage a supply and a waste cartridge,
5 said upper stage having a loading segment adapted to engage and move blades
 contained within said supply cartridge into a cutting position;
 - (b) clamping means for releasably holding said blades in place for cutting
 operations;
 - (c) power means for driving the movement of blades and clamping mechanisms;
10 and
 - (d) electronic control means for integrating all of the functions of the apparatus.
2. An improved blade supply cartridge wherein said cartridge comprises a body, a spring,
15 a dispensing tab, and blades, wherein said improvement comprises a toothed portion
 on said dispensing tab adapted to engage mating gear teeth on said blade changer.
3. An improved blade supply cartridge wherein said cartridge comprises a body, a spring,
 a dispensing tab, and blades, wherein said improvement comprises a touch memory
 device in contact with said cartridge, said touch memory device programmed to
20 contain content information relating to said cartridge.
4. The blade supply cartridge of claim 3 wherein said touch memory device comprises a
 Dallas Semiconductor DS1985 F5 16 Kbit add-only touch memory device.
- 25 5. The blade supply cartridge of claims 2 and 3 wherein the cartridge also has an
 entrance for accepting spent blades.
6. The blade supply cartridge of claims 2 and 3 wherein the cartridge has exterior
 alignment slots that engage with guides on the upper stage, thereby enabling precise
30 and reproducible alignment.

7. The blade supply cartridge of claim 5 wherein said exterior alignment slots position the cartridge in either the supply or waste position on the upper stage.

8. The apparatus of claim 1 wherein said clamping means comprises:

- 5 (a) a fixed support plate adapted to support a first side of said blade, said fixed support plate in intimate contact with the upper stage body;
- (b) a clamping plate having a clamping surface capable of engaging a second side of said blade when the clamping plate is pivoted into the clamping position;
- (c) a pivot means for supporting a midpoint region of said clamping plate, said
10 pivot means itself being integral to or supported by said upper stage;
- (d) a clamping cam that engages said clamping plate, said clamping cam being mounted on a drive shaft and providing motion orthogonal to drive shaft axis thereby pivoting the clamping plate about said pivot point.

15 9. The apparatus of claim 1 wherein said power means comprises

- (a) an electric motor mounted proximate to said drive shaft;
- (b) a motor pulley mounted between said drive shaft and said electric motor and interconnected therebetween so that power from said motor is transferred to said drive shaft; and
- 20 (c) a drive shaft for turning said clamping and said loading cams.

10. The apparatus of claim 1 wherein said electronic control means comprises a microcontroller in electrical communication with a switch located on a keypad, a power source, a motor, and a touch memory device located on said cartridges.

25 11. The apparatus of claim 10 wherein said power source is a DC battery.

12. The apparatus of claim 10 wherein said keypad contains a push-button switch for signaling the microcontroller to move a new blade into position.

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13. The apparatus of claim 10 wherein said safety interlocks comprise solenoid switches mechanically coupled to latches.

14. An automated rotary microtome blade changing apparatus, comprising

- 5 (a) an upper stage adapted to releasably engage a supply and a waste cartridge, said upper stage including a loading segment adapted to engage and move blades contained within said supply cartridge into a cutting position;
- (b) clamping means for releasably holding said blades in place for cutting operations, comprising
- 10 a fixed support plate adapted to support a first side of said blade, said fixed support plate in intimate contact with the upper stage body,
- a clamping plate having a clamping surface capable of engaging a second side of said blade when the clamping plate is pivoted into the clamping position,
- a pivot means for supporting a midpoint region of said clamping plate, said
- 15 pivot means itself being integral to or supported by said upper stage,
- a clamping cam that engages said clamping plate, said clamping cam being mounted on a drive shaft and providing motion orthogonal to drive shaft axis thereby pivoting the clamping plate about said pivot point;
- (c) power means for driving the movement of blades and clamping mechanisms,
- 20 comprising
- an electric motor mounted proximate to said drive shaft,
- a motor pulley mounted between said drive shaft and said electric motor and interconnected therebetween so that power from said motor is transferred to said drive shaft, and
- 25 a drive shaft for turning said clamping and said loading cams; and
- (d) electronic control means for integrating all of the functions of the apparatus, comprising
- a microcontroller in electrical communication with a switch on a keypad, a power source, a motor, and safety interlocks.
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15. An automated rotary microtome blade changing apparatus, comprising

(e) an upper stage adapted to releasably engage a supply and a waste cartridge, said upper stage including a reverser shuttle adapted to engage and move blades contained within said supply cartridge into a cutting position;

5 (f) clamping means for releasably holding said blades in place for cutting operations, comprising a fixed support plate adapted to support a first side of said blade, said fixed support plate in intimate contact with the upper stage body, a clamping plate having a clamping surface capable of engaging a second side of said blade when the clamping plate is pivoted into the clamping position, a pivot means for supporting a midpoint region of said clamping plate, said pivot means
10 itself being integral to or supported by said upper stage, a clamping cam that engages said clamping plate, said clamping cam being mounted on a drive shaft and providing motion orthogonal to said drive shaft axis thereby pivoting the clamping plate about said pivot point;

15 (g) power means for driving the movement of blades and clamping mechanisms, comprising an electric motor adapted to engage said drive shaft, a drive gear mounted on said drive shaft, said drive gear transmitting power to said clamping means and said reverser shuttle; and

20 (h) electronic control means for integrating all of the functions of the apparatus, comprising a microcontroller in electrical communication with a switch on a keypad, a power source, a motor, and safety interlocks.